

COLORADO DEPARTMENT OF HEALTH
HAZARDOUS MATERIALS AND WASTE MANAGEMENT DIVISION
MEMORANDUM

SUBJECT: Comments on the September, 1989 Ground Water Assessment Plan

DATE: 21 March 1990

GENERAL: The September 1989 Ground Water Assessment Plan for Rocky Flats Plant is severely deficient in providing guidelines for compliance within the requirements of 6 CCR 1007-3, Part 265, Subpart F.

1. The authors of this plan do not indicate an understanding of which regulations this plan should fall under. Overall, this plan is very poorly thought out and may be an indication of the lack of attention to detail present in previous dealings with Rocky Flats.
2. The plan, as presented, does not have the ability to determine the rate and extent of migration of any possible contamination at the regulated units (violation of §265.93(d)(4)).
 - Geologic formations have not been adequately characterized for their composition and hydrologic qualities.
 - The uppermost aquifer has not been identified for each regulated unit.
 - Confining layers have not been identified for the uppermost aquifer of each regulated unit.
 - Future well sites are not placed in a manner so as to detect any possible releases from regulated units.
 - Current well sites do not identify which formations, or portions of formations, they monitor.
3. No information is provided on how the data obtained from the monitoring wells will be statistically analysed with other data from both previous sampling events and monitoring wells that are part of a given regulated unit's system.
4. No certification by a qualified geologist has been provided for the assessment plan, as required by 6 CCR 1007-3, Part 265, Subpart F.

Correct

SPECIFIC:

Section I.3: Under §265.93(d)(4), the owner/operator is required to prepare a ground water quality assessment plan which is capable of determining whether or not hazardous wastes or hazardous waste constituents have entered into the ground water, what their migration rates and extents are, and what concentrations are present. The plan, as presented, is very general and not unit-specific. The Present Landfill and West Spray Field are monitored under an alternate monitoring system pursuant to §265.90(d). The Solar Evaporation Ponds are monitored under an assessment program under §265.93(d)(3,4). Other units have not been identified as requiring monitoring under the interim status requirements of 6 CCR 1007-3, Part 265, Subpart F, and should not be included in the plan.

ADMIN RECORD

A-SW-001227

1.4 Under §265.93(d)(3)(iv), the owner/operator is required to give a schedule of implementation for the assessment plan. Stating "this plan has been implemented" does not provide that schedule. A schedule, even if already completed, should be listed in the plan. If changes are necessary, this process can also be completed more easily with an established implementation schedule.

2.1 The geology provided in this section is too general to give an accurate portrait of the geologic structure underlying the regulated units covered in this plan. Stratigraphic sections should be provided in enough detail to show which geologic units are included in the uppermost aquifer for each given unit (§265.90(a)).

It should be determined if there are hydraulic connections between different geologic units before blanket assumptions are made concerning the extent of the uppermost aquifer. If hydraulic connections are present between units, they should be included in the definition of the uppermost aquifer for the regulated area (§265.90(a)).

No structural information is provided for the geologic units in the Rocky Flats area (i.e., slump blocks, faulting and jointing in units), even though these features are present in the area and may influence ground-water flow. These features can have a strong effect on the hydraulic conductivity of a given unit and should be included in any specific characterization to provide the true rate and extent of any contaminant migration that may be present.

Detailed geologic maps showing both surficial and bedrock units are necessary for the area of the regulated units. These maps should include specific geologic cross-sections over limited areas (the extent of a regulated area's monitored zone, for example) with data generated from various geophysical and borehole studies. Once this mapping has been completed, accurate characterizations of ground-water flow can be made for each area of concern.

2.2.1 No unit-specific characterization of the Rocky Flats Alluvium, including field or laboratory hydraulic conductivity tests, are provided in this description. Without this information, the rate and extent of contamination cannot be determined (violation of §265.93(d)(4)).

2.2.2 No unit-specific characterization of the Valley Fill alluvium and colluvium, including field or laboratory generated hydraulic conductivity tests, are provided in this description. Without this information, the rate and extent of contamination cannot be determined (violation of §265.93(d)(4)).

2.2.3 Characterization of the Arapahoe Formation is very general at best and appears to be taken almost verbatim from the description made by LeRoy and Weimer (1971). No site-specific information, including field and laboratory conductivity tests, is provided for this extremely variable formation. As stated previously, the rate and extent of contamination cannot be determined from the information provided (violation of §265.93(d)(4)).

2.2.4 Both the Laramie and Fox Hills formations have not been specifically characterized at the Rocky Flats Plant in this plan. If these units are considered to be the confining layers for the uppermost aquifer, this is not specifically stated.

2.3. The information provided in this section is extremely general at best (for example, although interceptor ditches are shown, no rationale is provided for their placement). Unless there is a direct bearing on the ground water systems under review in this plan, surface drainage information should not be included.

3.1 It is obvious from this discussion that the provisions of the regulations which cover the alternate monitoring systems at Rocky Flats Plant are not understood. The plant's ground water monitoring systems fall under the regulatory scope of 6 CCR 1007-3 and not any other regulations.

3.1.1 "Aquifer" is defined in §260.10 as "a geologic formation, group of formations, or part of a formation capable of yielding a significant amount of ground water to wells or springs." "Significant" is not further defined by 40 CFR Subpart B 191.12(m); this regulation has no bearing on whether or not the geologic units at Rocky Flats can be defined as an aquifer.

Since specific hydraulic conductivities of the units are not provided in previous sections, there is no definite proof that the upper geologic units at Rocky Flats Plant are "incapable of yielding significant amounts of water." No test data is provided to back up the assumption that all permeabilities of formations are less than 5.3×10^{-3} cm/s. Without this data, the aquifer has not been properly characterized and the rate and extent of migration of any contamination cannot be determined (violation of §265.93(d)(4)).

3.1.2 The Rocky Flats Plant monitoring systems for the interim status regulated units are covered under 6 CCR 1007-3, Part 265, Subpart F, not 40 CFR Part 264, Subpart F. Part 264 in both 40 CFR and 6 CCR 1007-3 covers only permitted hazardous waste units.

The Rocky Flats Alluvium (Q_{rf}), Valley Fill Alluvium (Q_{vf}), and other units considered for inclusion in the uppermost aquifer are, by definition, aquifers (6 CCR 1007-3, Part 260.10).

Any units underlying the regulated areas should be included in the uppermost aquifer if they are hydraulically connected to upper strata already considered a part of that aquifer (§260.10, 265.90(a)).

Due to the variability of the geologic strata in the area, the uppermost aquifer should be characterized separately for each regulated unit.

3.2 Again, the interim status units at the Rocky Flats Plant are regulated under 6 CCR 1007-3, Part 265, Subpart F, not 40 CFR 264.95 (a).

3.2(continued) The point of compliance should be specified separately for each regulated unit. For example, the point of compliance for the Solar Evaporation Ponds is a line circumscribing the horizontal extent of the actual impoundments. It does not include the interceptor system. The point of compliance of the uppermost aquifer is a vertical plane drawn at that line extending into the ground for the complete thickness of the uppermost aquifer.

3.3 Ground water monitoring wells should be sited with the following considerations in mind:

- the rate and extent of any migration; and
- the concentrations of the hazardous waste or hazardous waste constituents (6 CCR 1007-3, part 265.93(d)(4)(i,ii,iii)).

Geophysical surveys should be done throughout the site to assist in characterizing the boundaries of the geologic units underlying the regulated units. The results of the soil gas surveys should also be used to assist in well siting.

3.3.1 The plan claims the lateral extents of the Rocky Flats and Valley Fill alluvia and the site colluvium are "well-known." A detailed map showing these would be useful in proving this statement.

Cross-sections using borehole data from regulated units should also be presented to prove the owner/operator is actually able to characterize accurately the rate and extent of any contaminant migration (§265.93(d)(4)).

Data showing water levels from all 280+ wells, if done on a monthly basis as the plan claims, should be provided in the annual ground water monitoring report and used to generate potentiometric maps for each month. These monthly maps should be analyzed for variations in ground water flow, which would also aid in determining the rate and extent of migration of any ground water contamination present (§265.93(d)(4)).

The schedule showing which wells are measured and their sampling order should be included in this plan (§265.93(d)(3)(ii, iii)). Data from single well response tests, including the date conducted and measured results, should either be presented here to back up the previous statements that the hydraulic conductivities in the studied geologic units are low, or presented in the annual ground water reports. Methods used for calculating the hydraulic conductivity of the wells tested should be included, as well as the changes in potentiometric surfaces.

3.3.2 What are the "anticipated future remedial alternatives"?

3.3.2.1 Three hundred feet for well spacing seems to be a nice, round "picked out of the air" number with little, if any, good reasoning for the value. Have variabilities between and within units been taken into consideration?

3.3.2.1(continued) There is no characterization of the vertical extent of any plumes which may be or might have been released from a given unit. Without this consideration for well placement, the uppermost aquifer has not been adequately characterized, and the actual rate and extent of any contamination cannot be determined as required in §265.93(d)(4). Nesting of wells should be considered when fine-tuning the system to provide better information.

3.4 No schedule is provided for well development. Methods for developing wells are also not provided.

3.4.2 Water level measurements should be compared to the logged well depths for verification and to give approximate amounts of sediment in the wells for redevelopment purposes.

3.4.3 The sampling protocols referenced here are not stringently followed by sampling personnel in the field, especially in regard to sample preservation (for example, it was observed in the field that HCl was used instead of HNO_3 to preserve radionuclide samples). If the plan is not followed, there is no assurance that sample data can accurately determine if any contaminants are present in the area, as well as their rate and extent of migration and concentration (§265.93(d)(4)).

3.4.4 Lack of use of the sampling plan in the field does not assure that data obtained from samples accurately reflects the nature of any contaminants present in the area, as well as their rate and extent of migration and concentration (§265.93(d)(4)).

3.4.6 No explanation of the systems used for ground-water data management are provided in this plan (violation of §265.93(d)(3)(iii)). This plan should either have these methods listed or should reference them.

3.5.2 The plan does not provide any explanation of background tolerance levels and how they are determined (violation of §265.93(d)(3)).

No information is given on how the site's downgradient well data are compared to background data (e.g., statistical tests, confidence intervals used, "best fit" tests). What methods are used to evaluate the constituents that naturally occur in ground water at and around the site?

With a great deal of old data being discounted due to sloppy sampling techniques, poor quality control, or other problems, steps need to be taken to ensure any possible trends can be identified if there is contamination. Data which has been discounted needs to be flagged as such, but it should be analyzed to obtain a better understanding of any possible trends.

3.5.2(continued) The plan needs to specify which downgradient data will be compared with which background values. Sources of background ranges need to be identified, and their methods of verification provided (§265.93(d)(3)). The plan also needs to list which discrete percentages are used for determining this data, as well as which statistical tests are used for this and the rationale for using them.

The plan cites nine background stations that are used for data points. These stations should be provided in the plan in some format and should include the following:

- the geologic strata and regulated units which they monitor;
- whether or not these strata are a part of the uppermost aquifer for the regulated units (they should be, in accordance with 265.93(d));
- how their results are verified.

Serious consideration should be given to the small number of wells used for background studies. Depending on their location and screened intervals, these wells may not be adequate to provide an accurate assessment of the background at each of the regulated units.

Graphic representations of well data for intrastation comparisons will be very useful in determining the extent of the contamination plumes; but, they must be generated first in order to use them. Interpretation of data to determine the rate and extent of any contamination is required by §265.93(d)(3, 4).

3.6 There is no implemented policy for evaluating dry wells at Rocky Flats plant. Although the plan states that monthly water level measurements are taken, no information is given on what actual parameters constitute a dry well. In the past, this definition has included wells which did not produce enough water to allow collection of a full suite of samples. Unless these wells and any seasonal variations in the water table can be taken into consideration, the rate and extent of any possible contamination, as well as its concentration, cannot be determined accurately (§265.93(d)(4)).

3.8 No listings are provided for explaining where ground-water assessment records are kept by the facility. Also, no names are provided as contacts on how to obtain this information. What types of databases are used for records maintenance? How often are these updated?

4.0 All of the regulatory requirements necessary for compliance with the hazardous waste regulations are presented in this section, but they were not used throughout this plan to provide support for ground water monitoring rationale at Rocky Flats.

5.0 In the Comments column of Table 5.1, wells are listed as "upgradient," "downgradient," and "sidegradient." What are these positions in relation to?

Table 5.2 There are no listed or proposed downgradient bedrock wells for the West Spray Field, even though sandstone units are known to subcrop under the regulated area. This does not allow for complete characterization of the uppermost aquifer, and the rate and extent of any contamination, as well as the concentrations, cannot be determined accurately (violation of §265.93(d)(4)).

Why are wells 52-86 and 46-86 not listed as being in the uppermost aquifer of the regulated unit?

Table 5.4 Where do the downgradient wells begin in this table?

Wells drilled into the sandstone which subcrops under the Solar Evaporation Ponds are listed as not being part of the uppermost aquifer. However, these units have been listed previously as being hydraulically connected to the Rocky Flats alluvium, and thus would be part of the uppermost aquifer by definition (§260.10).

Figure 5-1 This map does not give an accurate representation of the ground water at Rocky Flats Plant. As stated previously in the plan, the uppermost aquifer is highly variable seasonally, and maps showing the variations would be more useful in characterizing the uppermost aquifer.

5.2 How is the Present Landfill impacting downgradient ground water but not showing a contaminant plume? What background levels were barium, molybdenum, sodium, strontium, uranium, sulfate, and total dissolved solids compared to to produce this conclusion?

5.4 The Original Process Waste Lines, although part of the operable unit including the Present Landfill, Solar Evaporation Ponds, and West Spray Field, have not been characterized for assessment and should not be included in this plan.